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SUBJ Evaluation of U S Marine Corps Recruit Depot's Status
under the RCRIS Corrective Action Environmental Indicator
Event Codes (CA725 and CA750)
EPA ID No SC6 170 022 762

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I PURPOSE OF MEMO

This memo is written to formalize an evaluation of U S Marine Corps Recruit Depot's status in relation to the following corrective action event codes defined in the Resource Conservation and Recovery Information System (RCRIS):

- 1) Human Exposures Controlled Determination (CA725)
- 2) Groundwater Releases Controlled Determination (CA750)

Concurrence by the Federal Facilities Branch Chief is required prior to entering these event codes into RCRIS. Your concurrence with the interpretations provided in the following paragraphs and the subsequent recommendations is satisfied by dating and signing above. See Memo Attachment 1 for more specific information about the RCRIS definitions for CA725 and CA750.

II. HISTORY OF ENVIRONMENTAL INDICATOR EVALUATIONS AT THE FACILITY AND REFERENCE DOCUMENTS

This particular evaluation is the first evaluation performed by EPA for U.S. Marine Corps Recruit Depot (MCRD), Parris Island, South Carolina. The evaluation, and associated interpretations and conclusions on contamination, exposures and contaminant migration at the facility, are based on information obtained from the following documents

- 1 Initial Assessment Study (IAS)
Marine Corps Recruit Depot
Parris Island, South Carolina
September 1986
2. RCRA Facility Assessment (RFA) Report
U S. Marine Corps Recruit Depot
Parris Island, South Carolina
April 1990
3. Remedial Investigation
Final Report
Marine Corps Recruit Depot
Verification Step
Parris Island, South Carolina
May 1990
4. Extended Site Inspection Report
Causeway Landfill
Marine Corps Recruit Depot
Parris Island, South Carolina
August 1992
- 5-7. Master Work Plan- Final
Volumes 1, 2 and 3
Marine Corp Recruit Depot
Parris Island, South Carolina
November 1990

III. FACILITY SUMMARY

MCRD is located approximately one (1) mile south of the Port Royal city limits and about three (3) miles south of Beaufort, in the southeastern corner of South Carolina. MCRD consists of 8047 acres, of which 3274 acres are dry land, 4344 acres are salt marsh, and 429 acres are saltwater creeks and ponds. The dry land consists of several islands, the largest of which is Parris Island. Most of the Depot's training, administrative, housing and resource management facilities are located on Parris Island. MCRD is situated on relatively flat land, with elevations varying between zero (0) and twenty-two (22) feet above mean sea level (msl), and averaging four (4) feet above msl. During extremely high tides, low-lying areas are covered by salt water.

The mission of MCRD is to provide for the reception and recruit training of enlisted personnel upon their initial entry into the Marine Corps; to provide field and combat skills training for recruits; to provide schools to train enlisted Marines as drill instructors and field staff; to conduct

rifle marksmanship training for Marine officers and enlisted personnel in the southeastern United States and for personnel of other services as requested, and to conduct training for Marine reserves

Present waste management practices consist of managing the following waste oil, rags contaminated with solvents, thinners, oils and fuels, paint wastes; unrinsed pesticides containers; and soil contaminated with No. 6 fuel oil. These wastes are contained in drums located at satellite accumulation areas (SAAs) prior to transfer to the Hazardous Waste Storage Building (SWMU 36) and then offsite. Scrap metal, appliances, tires, batteries, empty bullet shells, and other surplus/salvage items are stored at the Defense Reutilization and Marketing Office (DRMO) Salvage Yard (SWMU 35). Two (2) active landfills are maintained at MCRD. The Inert Disposal Area A (SWMU 11) receives cellulosic construction rubble. The Inert Disposal Area C (SWMU 13) receives marine spoils from the facility waterways. Inert Disposal Area B (SWMU 12) was used from 1976 to 1979 to receive cellulosic rubble.

Wastes generated by shops and support services at MCRD include waste oil; liquid and solid paint wastes, perchloroethylene still bottoms; rags soaked with oils and solvents (naphtha), domestic refuse, domestic sewage, construction debris; weapon cleaning rags, mercury amalgam; beryllium waste; PCB oils; and scrap metal.

Past waste management practices included disposal of wastes directly onto soil. The Pesticide Rinsate Disposal Area (SWMU 16) received pesticide rinsate containing DDT. Paint wastes were disposed directly on the soil at the Former Paint Shop Disposal Area (SWMU 5). The Paint Waste Storage Area (SWMU 8) was an unlined storage area that received frequent spillage of paint thinners and other liquid paint wastes. MCRD fire training activities used to be conducted at an unlined area in the northeast section of the facility. This unit is known as the Dredge Spoils Area Fire Training Pit (SWMU 4). Fire training is at present conducted at the Marine Corps Air Station in Port Royal.

MCRD has never been issued a RCRA permit, and there appears to be no likelihood of one being issued in the future, as the facility has successfully withdrawn its RCRA permit application for hazardous waste storage. EPA placed MCRD on the NPL in January 1995. The Marine Corps has decided that installation restoration work at MCRD will encompass both CERCLA and RCRA requirements.

IV. CONCLUSIONS AND STATUS CODE RECOMMENDATION FOR CA725

Based on the media-by-media evaluation presented in Memo Attachment 2, the assumption has been made that previously documented groundwater contamination at MCRD still exists. The finding has been made that, at this time, there is plausible risk of human exposure to contaminated ground water via migration into surrounding surface water bodies.

Because human exposures are deemed not currently controlled for contaminated ground water, it is recommended that CA725 NO be entered into RCRIS

V CONCLUSIONS AND STATUS CODE RECOMMENDATION FOR CA750

Based on data contained in the documents referenced in Memo Attachment 2 and summarized in the groundwater portion of the same attachment, releases from SWMUs and/or AOCs have contaminated the ground water at concentrations above relevant action levels.

Although the ground water is contaminated above relevant action levels, control measures have not been implemented. Nevertheless, they are deemed necessary at the present time. Because not all groundwater contamination at the facility is controlled, it is recommended that CA750 NO be entered into RCRIS

VI. SUMMARY OF FOLLOW-UP ACTIONS

In view of the absence of post-1990 sampling data for soil and ground water, it is not known what the current state of environmental media contamination is at this time. At present, follow-up action is contemplated in the investigation of environmental media proposed in the Final Master Work Plan. The specific remedies to be pursued will be dependent upon the results of this investigation. The Final Master Work Plan was approved in June 1998. The remedial investigation commenced in May 1998 and field work is scheduled to be completed in September 1998. The facility has implemented an interim action at SWMU 45, the dry cleaner spill site. The facility has also installed a groundwater pump and treat system which has treated over 200,000 gallons of groundwater to date.

MEMO ATTACHMENT 1

A. HUMAN EXPOSURES CONTROLLED DETERMINATION (CA725)

There are five (5) national status codes under CA725. These status codes are:

- 1) YE Yes, applicable as of this date (i.e., human exposures are controlled as of this date).
- 2) NA Previous determination no longer applicable as of this date.
- 3) NC No control measures necessary.
- 4) NO Facility does not meet definition (i.e., human exposures are not controlled as of this date)
- 5) IN More information is needed.

The first three (3) status codes listed above were defined in the January 1995 Data Element Dictionary for RCRIS. The last two (2) status codes were defined in the June 1997 Data Element Dictionary.

Note that CA725 is designed to measure human exposures over the entire facility (i.e., the code does not track SWMU-specific actions or success). Every area at the facility must meet the definition before a YE or NC status code can be entered for CA725. The NO status code should be entered if there are current unacceptable risks to humans due to releases of hazardous wastes or hazardous constituents from any SWMU(s) or AOC(s). The IN status code is designed to cover those cases where insufficient information is available to make an informed decision on whether or not human exposures are controlled. If an evaluation determines that there are both unacceptable and uncontrolled current risks to humans at the facility (NO) along with insufficient information on contamination or exposures at the facility (IN), then the priority for the EI recommendation is the NO status code.

In the opinion of Region 4, the previous relevance of NA as a meaningful status code is eliminated by the June 1997 Data Element Dictionary's inclusion of NO and IN with the existing YE and NC status codes. In other words, YE, NC, NO and IN cover all of the scenarios possible in an evaluation or reevaluation of a facility for CA725. Therefore, it is the opinion of Region 4 that only YE, NC, NO and IN should be utilized to categorize a facility for CA725. No facility in Region 4 should carry a NA status code.

B. GROUNDWATER RELEASES CONTROLLED DETERMINATION (CA750)

There are five (5) status codes listed under CA750.

- 1) YE Yes, applicable as of this date (i.e., groundwater releases are controlled as of this date).
- 2) NA Previous determination no longer applicable as of this date.
- 3) NR No releases to groundwater
- 4) NO Facility does not meet definition (i.e., groundwater releases are not controlled as of this date).
- 5) IN More information is needed

The first three (3) status codes listed above were defined in January 1995 Data Element Dictionary for RCRIS. The last two (2) status codes were defined in June 1997 Data Element Dictionary.

The status codes for CA750 are designed to measure the adequacy of actively (e.g., pump and treat) or passively (e.g., natural attenuation) controlling the physical movement of ground water contaminated with hazardous constituents above relevant action levels. The designated boundary (e.g., the facility boundary, a line upgradient of receptors, the leading edge of the plume as defined by levels above action levels or cleanup standards, etc.) is the point where the success or failure of controlling the migration of hazardous constituents is measured for active control systems. Every contaminated area at the facility must be evaluated and found to have the migration of contaminated ground water controlled before a "YE" status code can be entered.

If contaminated ground water is not controlled in any area(s) of the facility, the NO status code should be entered. If there is not enough information at certain areas to make an informed decision as to whether groundwater releases are controlled, then the IN status code should be entered. If an evaluation determines that there are both uncontrolled groundwater releases for certain units/areas (NO) and insufficient information at certain units/areas of groundwater contamination (IN), then the priority for the EI recommendation should be the NO status code.

In the opinion of Region 4, the previous relevance of NA as a meaningful status code is

eliminated by the June 1997 Data Element Dictionary's inclusion of NO and IN with the existing YE and NR status codes. In other words, YE, NR, NO and IN cover all of the scenarios possible in an evaluation or reevaluation of a facility for CA750. Therefore, it is the opinion of Region 4 that only YE, NR, NO and IN should be utilized to categorize a facility for CA750. No facility in Region 4 should carry a NA status code

MEMO ATTACHMENT 2

MEDIA-BY-MEDIA DISCUSSION OF CONTAMINATION AND THE STATUS OF PLAUSIBLE HUMAN EXPOSURES

Because assumptions have to be made as to whether or not human exposures to current media contamination are plausible and, if plausible, whether or not controls are in place to address these plausible exposures, this memo attachment examines each environmental medium (i.e., soil, ground water, surface water, air) at the entire facility (including any offsite contamination emanating from the facility) rather than from individual areas or releases. As a result of this independent media-by-media examination, conclusions were reached and a final recommendation was made as to the proper CA725 status code for MCRD. The conclusions and recommendation are presented in Section IV of the Environmental Indicator (EI) memo.

It was then necessary to evaluate MCRD for its CA750 status. Please note that CA750 is based on adequate control of all contaminated ground water at the facility. The conclusions and ultimate recommendation as to the appropriate CA750 status code for MCRD were derived from the groundwater section of the media-by-media examination found in this attachment, and are presented in Section V of the EI memo.

The specific documents used in evaluating ground water at MCRD are listed below:

1. Initial Assessment Study (IAS)
Marine Corps Recruit Depot
Parris Island, South Carolina
September 1986
2. RCRA Facility Assessment (RFA) Report
U.S. Marine Corps Recruit Depot
Parris Island, South Carolina
April 1990
3. Remedial Investigation
Final Report
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Verification Step
Parris Island, South Carolina
May 1990

4. ~~Extended~~ Site Inspection Report
Causeway Landfill
Marine Corps Recruit Depot
Parris Island, South Carolina
August 1992

It ~~should~~ be noted that very little has been done in the way of environmental investigation, and nothing in terms of remediation of contamination. Other than a 1992 study of marine life in the vicinity of the Causeway Landfill (see Reference No. 4), no analytical data is available from more recently than 1990 (Reference Nos. 2 and 3). Thus, it is obviously not possible to state in this memo what the current situation at MCRD is in regard to contamination of the various environmental media. In view of the shallow water table underlying Parris Island, and of the dilution effects caused by tides and by nearby marshes, creeks and rivers, environmental contamination (or the lack thereof) identified in 1990 may not resemble the contamination existing in 1998. It is quite apparent that extensive investigation of environmental media is necessary. Such investigation is being planned, and the proposal is presented in Volume III of the MCRD Draft Final Master Work Plan (Reference No. 7). Once these investigations have been completed, additional information will be available for an informed decision to be made as to the appropriate remedial actions, if any, to be taken at MCRD.

Ground Water

MCRD is located on barrier-island sand, silt and clay deposits. Ground water beneath the facility consists of a surficial aquifer and the underlying Tertiary limestone aquifer. These two (2) units are separated by the impermeable Hawthorne formation, which consists of dense sandy clays approximately twenty (20) feet thick.

The water table of the surficial aquifer ranges from zero (0) to ten (10) feet below sea level, with an average depth of three (3) feet. This water table is strongly affected by tidal action and the resulting influence of the nearby tidal rivers and streams. The groundwater flow rate in the surficial aquifer averages between 0.1 and one (1) foot per day, with flow directed towards surface water bodies such as creeks, ponds and rivers. The surficial aquifer beneath MCRD is a poor potable water source due to salt water intrusion and high sulfur content resulting from decomposition of organic matter. As a consequence, the water in this aquifer is not used for any purpose. While there is potential for contamination of the surficial aquifer at MCRD, its shallow depth and geographic isolation from other land masses would most likely prevent contamination from migrating offsite to areas that use the surficial aquifer as a potable water source. Any contamination reaching this aquifer would instead be discharged to surrounding surface water bodies, potentially resulting in adverse impact to human health and the environment (e.g., the marine life in the surface water bodies and the people who fish in those waters).

The underlying Tertiary limestone aquifer is the principal water supply for south coastal South Carolina. However, below MCRD salt water intrusion has contaminated this deeper aquifer,

preventing it from being used as a water supply source for the Depot. The history of Tertiary limestone aquifer use at MCRD has been one of over-pumping, thereby artificially causing the saltwater contamination of the aquifer. The wells currently located at MCRD are employed for monitoring purposes but are not used for supplying water for potable or other uses. There appears to be little or no risk of surficial aquifer contamination penetrating into the underlying aquifer at MCRD. The Tertiary limestone aquifer is artesian and hydrologically separate from the overlying surficial aquifer. A confining layer separates the deep aquifer from the surficial aquifer and appears to prevent vertical mixing and the downward migration of contaminants to the deeper aquifer.

Data from 1990 indicate that releases from solid waste management units (SWMUs) and areas of concern (AOCs) have contaminated the surficial aquifer at concentrations above relevant action levels. The action levels of concern are either the tap water risk based concentrations (RBCs) or the maximum contaminant levels (MCLs). The contaminant constituents identified in the ground water, and their respective action levels, are presented in Table 1 below.

Table 1
Groundwater Contamination

<u>Contaminant</u>	<u>Max Concen. ug/l</u>	<u>Tap Water RBC. ug/l</u>	<u>MCL. ug/l</u>
1,2-dichloroethane	20	0.12	7
benzene	250	0.36	5
ethylbenzene	735	1300	700
chloroform	12	0.15	-
chromium	110	180	100
lead	73	-	15 *

* treatment technique action level

The ground water in the surficial aquifer has clearly been contaminated. Due to the lack of any data more recently obtained than eight (8) years ago, coupled with the tidal flushing of the aquifer, no definitive conclusions can be reached with regard to present-day contamination of this aquifer. However, in the absence of sampling data to the contrary, and in view of the fact that no remedial activities have taken place at MCRD, it is assumed that similar contamination still exists.

In addition to the observed groundwater contamination in the surficial aquifer, there are plausible human exposures to this contamination. While the surficial aquifer is not used as a source of drinking water at MCRD, and is recognized as being contaminated and unsuitable as a present or future water source, migration of aquifer contamination could readily occur, particularly into surrounding surface water bodies, which are used by many people for fishing.

Based on the above discussion and on the assumption that the state of contamination documented in 1990 exists today, plausible human exposures to groundwater contamination exist, are not controlled, and necessitate control measures. Active measures (such as a pump-and-treat system) could be implemented in an attempt to arrest the movement of contaminated ground water and eliminate it to the greatest extent practical. However, given the previously-discussed hydrology surrounding and underlying MCRD, the control measure most likely to eliminate groundwater contamination is the removal of contaminant sources (i.e., the wastes buried in pits and landfills)

Surface Water

Surface runoff from most of the working areas of MCRD flows into storm sewers that discharge into the marshes surrounding Parris Island. Surficial water bodies can be contaminated by SWMUs and/or AOCs releasing hazardous constituents to soil or ground water or by SWMUs in direct contact with these surface waters. The very low elevation of the land surface and the shallow water table of the surficial aquifer at MCRD would likely cause surficial aquifer water to discharge into nearby surface waters. The migration of any contaminants in the surficial aquifer would be facilitated by water table fluctuations caused by tidal changes, which would induce a flushing action that would accelerate both the dispersal of surficial aquifer contamination and discharge into the surface waters.

A 1992 study (Reference No. 4) of maximum chemical tissue concentrations for five (5) species of marine life in surface waters surrounding the Causeway Landfill (SWMU No. 3) did not document a public health risk associated with the consumption of seafood caught at this site. No data available to date indicates the existence of surface water contamination at MCRD. It should be kept in mind, however, that such contamination could be present. If contamination does exist, tidal flushing and dilution could make the contamination ephemeral in nature.

Because contamination has not been documented to have occurred in MCRD surface waters, there are at this time no known plausible human exposures which must be controlled due to contamination entering such waters.

Soil

Releases from SWMUs and/or AOCs have not been documented to have occurred above relevant action levels, despite the facility's past history of storing and disposing of wastes on bare soil. It is possible that contaminants have been washed away in surface runoff. It is also possible that an in-depth soil sampling program will detect contamination in soils at MCRD. The resolution of this question awaits the environmental investigation proposed in the Master Work Plan for MCRD.

Because contamination has not as yet been documented to have occurred in MCRD soils, there are at present no known plausible human exposures which must be controlled due to

contamination in the soils.

Air

Releases to air, either from operations at units or from soil, groundwater or surface water contamination, are not known to have occurred at concentrations above relevant action levels. Therefore, there appear to be no plausible human exposures to contamination via an air route, and no control measures are necessary.